ON THE NEW METHOD HEAVY-ION ELASTIC SCATTERING ANGULAR DISTRIBUTION ANALYSIS APPLICABILITY

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Using the $^{16}O + ^{208}Pb$ and $^{9}Be + ^{28}Si$ systems as a tasted ones, in one of which the projectile is tightly bound and is weakly bound in other one, the predictive power of the previously suggested new method of heavy-ion elastic scattering angular distribution analysis is studied. Apart of values obtained in traditional optical model heavy-ion differential cross section analysis the new method also allows to obtain the fusion and total peripheral reaction cross sections and there partial wave distributions. Comparison of calculated within the new method cross sections with experimental ones in a wide energy range shows that in the most cases they are coincide within its errors. In this paper different processes partial wave probability distributions are investigated giving more insight into the two heavy-ion collision formation mechanism of fusion and total peripheral reaction cross sections. In general, results of this paper show that method permits to obtain reliable results and so may be widely used for heavy-ion elastic scattering angular distribution analysis.